NIKO-SEM

# 0.8A Fixed and Adjustable Low Dropout Linear Regulator (LDO)

**L1087 Series**
**SOT-89,TO-92**

## GENERAL DESCRIPTION

The L1087 Series are positive and low dropout three-terminal voltage regulators with 0.8A output current capability. These devices are designed for use in low voltage applications that offers lower dropout voltage and faster transient response.

These devices are fully protected against over current faults, over temperature operation, reversed input polarity, reversed lead insertion, transient voltage spike …etc.

On-Chips trimming the reference voltage to 1% and features the low dropout of maximum 1.45 volts.

The L1087 Series regulators offer fixed and adjustable voltage options available in the space saving SOT-89 & TO-92 package.

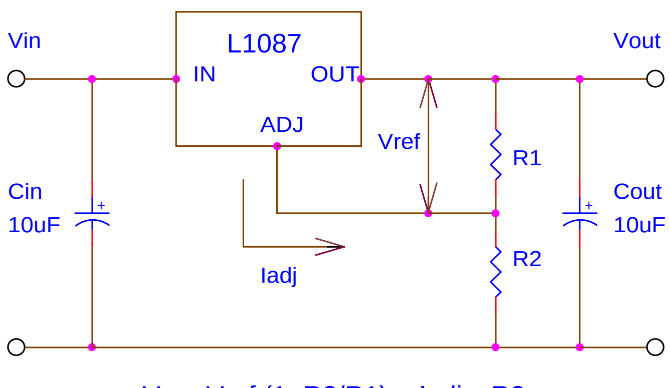
## FEATURES

- Fixed 3.3V or adjustable output voltage
- Low dropout voltage
- Low ground current
- Fast transient response
- Current & thermal limiting
- Line regulation: 0.5% typical
- Load regulation: 0.5% typical
- Available in SOT-89 & TO-92 package

## APPLICATIONS

- Low voltage micro-controllers
- Battery Chargers
- 5V to 3.3V linear regulators
- Motherboard clock supplies
- Post regulator for switching supplies

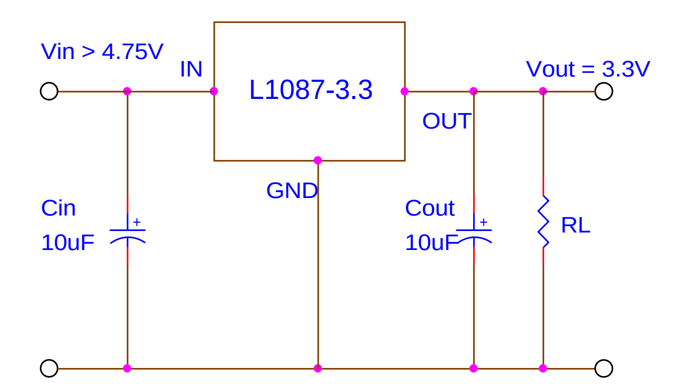
## TYPICAL APPLICATION




Vo = Vref (1+R2/R1) + Iadj x R2

1. Cin needed if device is far from filter capacitors.
2. Cout required for stability.

**- Basic Adjustable Regulator Circuit -**




1. Cin needed if device is far from filter capacitors.
2. Cout required for stability.

**- Fixed Voltage Regulator -**

## ABSOLUTE MAXIMUM RATINGS

- Maximum Supply Voltage: 15V*
- Power Dissipation: Internally Limited
- Thermal Resistance Junction to Case, $\theta_{JC}$: 18 °C/W
- Thermal Resistance Junction to Ambient, $\theta_{JA}$: 160 °C/W
- Operating Junction Temperature Range: 0 to 125 °C
- Storage Temperature Range: -40 to 150 °C
- Lead Temperature (Soldering, 10 Seconds): 260 °C

* When considering short circuits to ground, the maximum input-to-output differential voltage shall not be allowed greater than approximate 2~3V at values of supply voltage in excess of 10V, continuous short-circuits can exceed the power dissipation ratings and cause eventual destruction.

## ELECTRICAL CHARACTERISTICS (Unless otherwise specified, $T_A$ = 25 °C)

| Parameter | Symbol | Test Conditions | Typical | Limits |
|---|---|---|---|---|
| Reference Voltage (Adjustable version) | $V_{REF}$ | $V_{IN}$ = 5V, $I_{OUT}$ = 10mA | 1.25V | 1.23$V_{Min}$ 1.27$V_{Max}$ |
| Output Voltage (Fixed version) | $V_O$ | $V_{IN}$ = 5V, $I_{OUT}$ = 10mA | $V_O$ | 0.98$V_{O(Min)}$ 1.02$V_{O(Max)}$ |
| Dropout Voltage | $V_D$ | $\Delta V_{REF}$ = 1%, $I_{OUT}$ = 0.8A | 1.2V | 1.45V |
| Line Regulation | $REG_{(LINE)}$ | $(V_{OUT} + 1.5V) \leq V_{IN} \leq 15V$, $I_{OUT}$ = 10mA | 0.5% | 2% |
| Load Regulation | $REG_{(LOAD)}$ | $(V_{IN} - V_{OUT})$ = 2V, 10mA $\leq I_{OUT} \leq$ 0.8A | 0.5% | 2.5% |
| Minimum Load Current | $I_O$ | $1.5V \leq (V_{IN} - V_{OUT}) \leq 5.75V$ | 10mA | |
| Adjust Pin Current | $I_{ADJ}$ | | 55µA | 100µA |
| Current Limit | $I_{CL}$ | $V_{IN} - V_{OUT}$ = 2V | 1.2A | 0.9A (Min) |
| RMS Output Noise | $V_N$ | | 0.003% of $V_{OUT}$ | |
| Ripple Rejection Ratio | $R_A$ | f = 120Hz, $C_{ADJ}$ = 22µF for ADJ pin, $V_{IN}$ = 5V, $I_{OUT}$ = 0.8A | 72dB | 60dB (Min) |

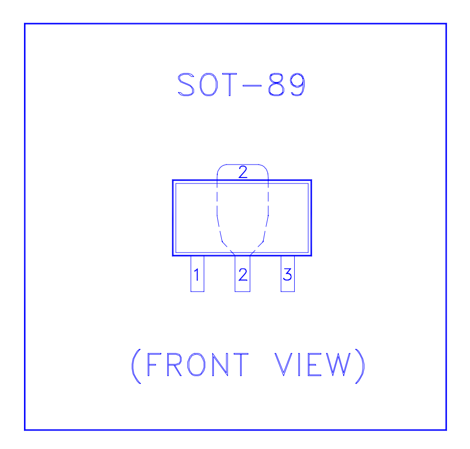
## ELECTRICAL CHARACTERISTICS FOR FIXED 3.3V (Unless otherwise specified, TA = 25 °C)

| Parameter | Symbol | Test Conditions | Typical | Limits |
|---|---|---|---|---|
| Output Voltage (Fixed version) | $V_O$ | $V_{IN}$ = 5V, $I_{OUT}$ = 10mA | $V_O$ | 3.234V(Min) 3.367V(Max) |
| Dropout Voltage | $V_D$ | $\Delta V_O$ = 1%, $I_{OUT}$ = 0.8A | 1.2V | 1.45V |
| Line Regulation | $REG_{(LINE)}$ | $(V_{OUT} + 1.5V) \leq V_{IN} \leq 15V$, $I_{OUT}$ = 10mA | 0.5% | 2.0% |
| Load Regulation | $REG_{(LOAD)}$ | $(V_{IN} - V_{OUT}) = 2V$, $10mA \leq I_{OUT} \leq 0.8A$ | 0.5% | 2.0% |
| Minimum Load Current | $I_O$ | $1.5V \leq (V_{IN} - V_{OUT}) \leq 5.75V$ | 10mA | |
| GND Pin Current | $I_{GND}$ | | 55µA | 100µA |
| Current Limit | $I_{CL}$ | $V_{IN} - V_{OUT}$ = 2V | 1.2A | 0.9A (Min) |
| RMS Output Noise | $V_N$ | | 0.003% of $V_{OUT}$ | |
| Ripple Rejection Ratio | $R_A$ | f = 120Hz, Co=22Uf, $V_{IN}$ = 5V, $I_{OUT}$ = 0.8A | 72dB | 60dB (Min) |

## DEVICE SELECTION GUIDE

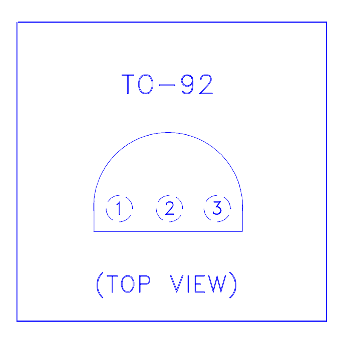
| Device | L1087C | L1087C-3.3 | L1087N-3.3 |
|---|---|---|---|
| Voltage Version | Adjustable | 3.3V | 3.3V |
| Package | SOT-89 | SOT-89 | TO-92 |
| Marking | L1087 | 87-3.3 | 87N-3.3 |

## PIN CONFIGURATIONS




| Pin # | Function |
|---|---|
| 1 | Adjust/Ground |
| 2 | Output |
| 3 | Input |

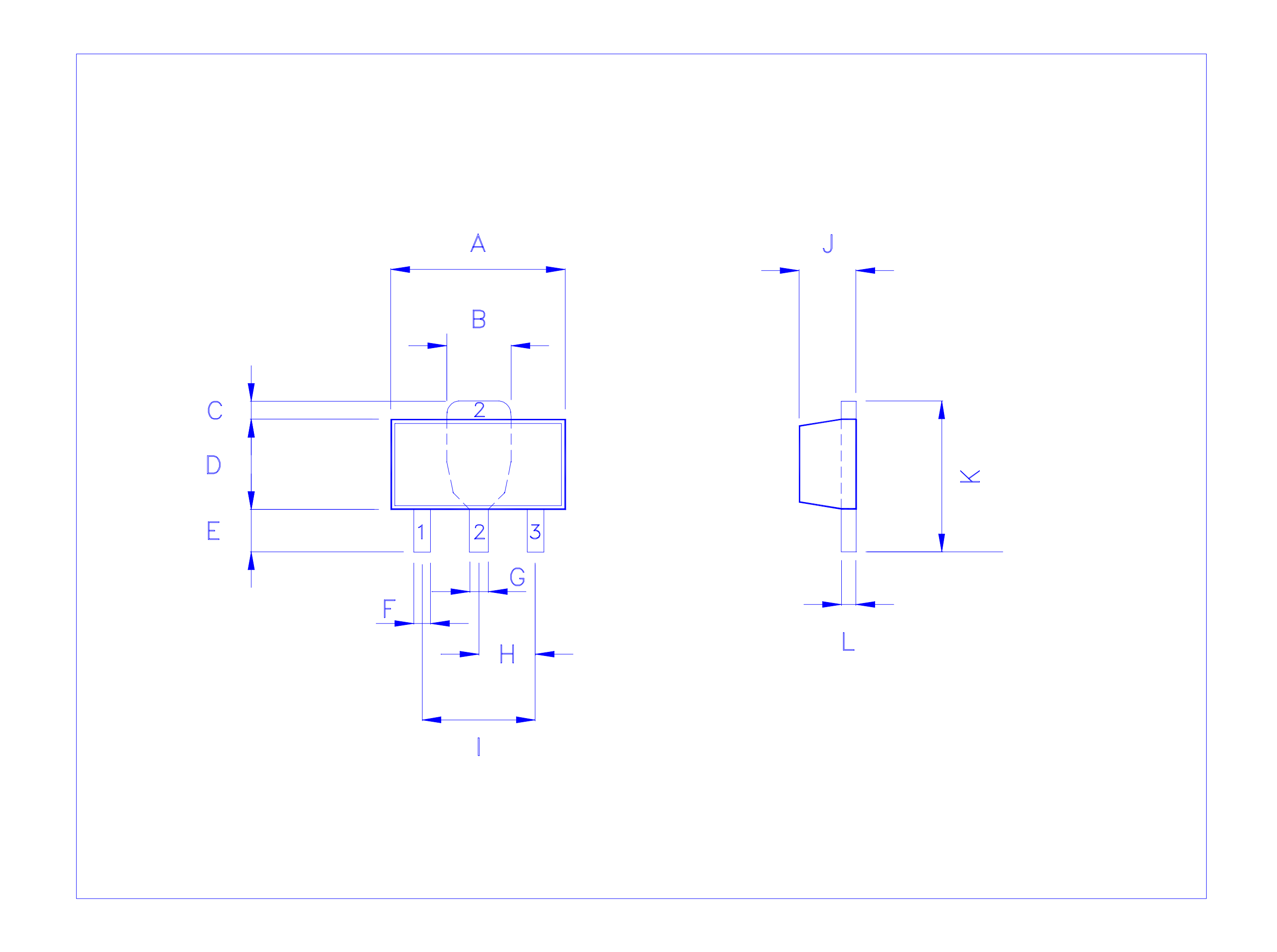
**Note: TAB is Output Pin**




| Pin # | Function |
|---|---|
| 1 | Output |
| 2 | Adjust/Ground |
| 3 | Input |

# SOT-89 MECHANICAL DATA

| Dimension | mm | | | Dimension | mm | | |
|---|---|---|---|---|---|---|---|
| | Min. | Typ. | Max. | | Min. | Typ. | Max. |
| A | 4.3 | 4.5 | 4.7 | H | 1.4 | 1.5 | 1.6 |
| B | 1.6 | 1.7 | 1.8 | I | 2.8 | 3.0 | 3.2 |
| C | 0.4 | 0.5 | 0.6 | J | 1.3 | 1.5 | 1.7 |
| D | 2.4 | 2.5 | 2.6 | K | 3.8 | 4.2 | 4.6 |
| E | 0.8 | 1.2 | 1.4 | L | 0.3 | 0.4 | 0.5 |
| F | 0.4 | 0.45 | 0.5 | M | | | |
| G | 0.4 | 0.5 | 0.6 | N | | | |



# TO-92 MECHANICAL DATA

| Dimension | mm | | | Dimension | mm | | |
|---|---|---|---|---|---|---|---|
| | Min. | Typ. | Max. | | Min. | Typ. | Max. |
| A | 4.445 | | 5.207 | H | 2.413 | 2.540 | 2.667 |
| B | 4.318 | | 5.334 | I | 0.356 | | 0.533 |
| C | 12.7 | | 15.5 | J | | | |
| D | 0.356 | | 0.533 | K | | | |
| E | 1.143 | 1.27 | 1.397 | L | | | |
| F | 3.175 | | 4.191 | M | | | |
| G | 0.762 | | 1.270 | N | | | |

